Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them	)	
	)	
and	)	**PR DOCKET NO. 92-235**
	)	
Examination of Exclusivity and Frequency Assignment Policies of the Private Land Mobile Radio Services	)	

PETITION FOR RECONSIDERATION AND CLARIFICATION

By its attorneys, Motorola Inc., (Motorola) hereby submits this Petition for Reconsideration and Clarification (hereinafter Petition) in response to the FCC's Report and Order in the above captioned proceeding.[1] While Motorola supports the Commission's actions, it hereby seeks reconsideration or clarification of the rules pertaining to modifications of type accepted equipment, the measurement procedures for emissions masks, the applicability of the new transient frequency response standards, and other modulation and emission requirements. Also, several inconsistencies or typographical errors in the rules are identified.

I. BACKGROUND

For more than four years, the FCC and the private land mobile industry have strived to develop a rational plan for the transition to more advanced technologies on private land mobile frequencies below 512 MHz. Basing its decision upon a consensus position expressed by the user community, the FCC properly decided that the existing operational environment, representing an infrastructure investment of approximately 25 billion dollars, necessitated a carefully crafted plan that relies upon marketplace incentives rather than

[1] *Report and Order and Further Notice of Proposed Rule Making, (hereinafter Report and Order)* PR Docket No. 92-235, FCC 95-255, released June 23, 1995

government edicts to spur the migration to more efficient technologies. Motorola believes that the fundamental approach adopted by the Commission strikes the appropriate balance between establishing deployment opportunities for very narrowband technologies and accommodating the variety of communications needs that has always defined the private land mobile services.

In brief, the FCC determined that it would manage the transition to advanced technologies through the equipment authorization process. As of August 1, 1996, any transmitting device submitted by a manufacturer for a grant of type acceptance for use on private land mobile frequencies below 512 MHz must be capable of operation on 12.5 kHz channels. Likewise, as of January 1, 2005, equipment submitted for type acceptance must be capable of operation on channels 6.25 kHz or less. At both timeframes, equipment designed to operate over wider bandwidths can be approved provided it meets a new equivalent efficiency standard. Coupled with this approach, the Commission has adopted a new channeling plan that creates channels every 6.25 kHz apart in the UHF frequency bands and every 7.5 kHz in the 150 MHz VHF band.

To the maximum extent possible, the Commission's *Report and Order* provides users with the flexibility to accommodate their disparate and wide ranging needs with a variety of technologies. For example, rural licensees operating where spectrum is not in short supply will not be required to replace serviceable equipment prior to the termination of its natural life cycle. Also, by allowing manufacturers to provide dual mode technology, *i.e.*, technology capable of operation over 25 kHz and 12.5 kHz channels or 12.5 kHz and 6.25 kHz channels, the Commission has provided a graceful transition path for large system users and will enable the public safety community to implement its APCO Project 25 plan. In Motorola's view, the Commission properly considered a variety of competing demands and developed a plan for encouraging spectrum efficiency that best suits the needs of private land mobile community.

Motorola has thoroughly reviewed the *Report and Order* and has uncovered only a few areas where further clarification or better articulation of the Commission's policies are warranted. In most instances, Motorola is presenting these issues as simply needing further clarification. To the extent necessary, however, we request reconsideration in those instances where the views outlined below do not comport with the Commission's policies.

I. TYPE ACCEPTANCE REQUIREMENTS

As noted, the *Report and Order* adopted a plan to influence the deployment of more narrowband private land mobile radios through the type acceptance process. In so doing, the Commission decided against mandatory obsolescence of existing technologies in favor of a flexible approach that allows "users the option of continuing to use existing equipment.".[2] Indeed, the *Report and Order* specifically provides that equipment type accepted prior to each of the specified transition dates may continue to be manufactured and used indefinitely. As clarification the Commission stated that "[f]or example, a 25 kHz radio that is allowed today can still be manufactured after August 1, 1996."[3]

The Commission indicated that it would allow existing equipment to undergo minor modifications and redesigns without threatening the equipment's approval. The Commission specifically stated that its type acceptance rules "provide some flexibility by which manufacturers can continue to support their existing equipment through upgrades and modifications."[4] For existing 25 kHz technology, however, this flexibility is severely limited by new Section 90.203(j)(6) which prohibits the Commission's Equipment Authorization Division from accepting applications for modification or permissible changes of type acceptance grants for transmitters designed to operate on channel bandwidths wider

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[2] *Report and Order* at para. 37.

[3] *Id.* at note 91.

[4] *Id.* at para. 40.

than 12.5 kHz granted prior to August 1, 1996, unless the transmitters have the inherent capability for multimode narrowband operation.[5]

Motorola believes that this rule section is inconsistent with the Commission's intent to allow manufacturers to upgrade existing technologies without having to comply with an entirely different set of technical standards. Motorola therefore recommends that the Commission clarify that existing 25 kHz radios that are type accepted prior to August 1, 1996, can undergo Class II permissive changes without demonstrating compliance with the Commission's new narrowband technical standards.[6]

As discussed in its comments filed earlier in this proceeding, Motorola manufactures 39 different product families for operation in these subject frequency bands. Many of these products are already capable of narrowband, *i.e.*, 12.5 kHz, operation. Others are not. For Motorola to continue to manufacture and support these different product lines, it is important to maintain our flexibility to modify and improve these radios in response to customer requirements, from changes in manufacturing technique, as a result of efforts to reduce costs and from the necessity of making changes in components in order to accommodate the availability of parts and subcomponents. When making minor changes to existing approved radios, it would be impractical to also add dual mode capability simply to satisfy the Commission's rules and without any regard to market forces.

As adopted, the Commission's rule requiring dual mode capability is unnecessary. The Commission's decision adequately ensures that the transition to more narrowband equipment will occur without heavy handed regulation. Therefore, there is no need to prohibit manufacturers from making minor design changes to existing 25 kHz technologies. For these reasons, Motorola asks that the Commission delete new section

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[5] 47 C.F.R. Section 90.203(j)(6).

[6] Class II permissive changes in type accepted equipment are defined in Section 2.1001 of the Commission's rules and generally refer to modifications that alter the performance of a transmitter without violating the FCC's minimum requirements for the particular device.

90.203(j)(6) in its entirety and instead allow modifications of all type accepted equipment consistent with Section 2.1001.

II. EMISSIONS MASK

When channel widths are reduced to levels adopted in this proceeding, the interference environment between adjacent channel systems assumes greater importance than previously addressed by Commission's rules. Traditionally, the most direct means of controlling interference to adjacent channel systems is through the use of an FCC derived emissions mask which limits the amount of energy that a transmitter places in spectrum located beyond the authorized channel width. In this proceeding, the Commission attempted to balance the need for protecting adjacent channel operations with the need to permit alternative modulation techniques that tend to occupy more of the assigned channel than traditional FM radio techniques.

With respect to the emissions mask adopted for 12.5 kHz technology, the Commission concluded that its proposed mask was "too restrictive" and that the "12.5 kHz emission mask proposed by TIA, although less restrictive than our proposed mask, provides acceptable adjacent channel protection."[7] Since, in the Commission's view, the TIA mask was designed to principally accommodate only reduced deviation analog and digital FDMA technologies, the *Report and Order* modified the TIA submission by employing the "flat top characteristic of the Ericsson suggested mask and the roll off characteristic of the skirt region of the TIA suggested mask."[8]

In reviewing the rules adopting this policy, it becomes clear that the FCC did not adopt all of the characteristics of the TIA mask as proposed by that body. Section 90.210(d)(4) provides that measurements showing compliance with the emissions mask requirements must be made with a instrument having a resolution bandwidth set to 100 Hz.

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[7] *Report and Order* at para. 86.

[8] *Id.* at para. 87.

This is in contrast to the recommendations of the TIA which would require the resolution bandwidth of the measuring device to be set to 300 Hz. The lesser resolution specified by the FCC would result in an additional 5 dB of energy to be placed into the adjacent channels. This additional 5 dB of adjacent channel interference will affect adjacent channel operations by reducing range. It is therefore recommended that the Commission conform this rule section with its stated policy of adopting the TIA skirts and thus require emission measurements to be taken with the resolution bandwidth of spectrum analyzers set to 300 MHz.

The preservation of the additional 5 dB of adjacent channel protection realized through the TIA's recommended measurement procedures will have a real world effect on spectrum efficiency. Reducing adjacent channel protection by liberalizing the emissions mask will require greater geographical separations between stations operating on adjacent channels. This will reduce any spectrum efficiency gains realized through the Commission's new narrowband channeling plans. The alternative to greater geographical separation would be a reduction in the range of the adjacent channel system. Either result -- greater geographical separations or reduced service range -- are unnecessary detriments to spectrum efficiency. As the Commission noted, there new assignment plans provide insufficient protection to permit same area, high power adjacent channel operations.[9] The Commission's adopted meaurement procedure for the emissions mask exacerbates this problem. Motorola therefore requests that the FCC modify Section 90.210(d)(4) to specify that measurements must be taken with a resolution bandwidth of 300 Hz. In so doing, the FCC would be ensuring a higher quality of service while fostering a higher degree of frequency reuse without impinging on the flexibility of manufacturers to develop and implement alternative modulation schemes.[10]

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[9] *Id.* at para. 76.

[10] Motorola notes that while the emissions mask as revised will adequately protect most installations, its continued utility is being threatened by the variety of modulation schemes and technologies being introduced in the private land mobile frequency bands. For this reason, Motorola is working with the TIA

III. TRANSIENT FREQUENCY RESPONSE

In Section 90.214, the Commission has imposed new requirements on transmitting equipment to reduce the occurrence of noise "chirps" caused during powering on or off. In so doing, the FCC rejected Motorola's position that the issue was being sufficiently addressed through voluntary industry standards leaving federal regulatory intervention unnecessary. Rather, the Commission instead incorporated into its rules the voluntary industry standards contained in EIA/TIA Standard 603.

While Motorola disagrees that this issue currently warrants FCC action at this time,[11] it does not oppose the actions taken in the *Report and Order.* However, further clarification of the Commission's intent is necessary. The rule section as written does not make clear that the standard is applicable in the type acceptance process and not an operational requirement applicable to existing, field installed equipment.[12] Motorola proposes that the existing introductory language be replaced with the following: "Transmitters designed for operation in the 150-174 MHz and the 421-512 MHz frequency bands submitted for type acceptance on or after January 1, 1996, must maintain transient frequencies within the maximum frequency difference limits during the time intervals

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to develop standards for an alternative measurement procedure known as the adjacent channel interference protection ratio (ACPR). A direct measurement of the energy imposed into the adjacent channel bandwidth, the ACPR promise to be a useful tool to either complement or replace the emissions mask once its developmental work is completed.

[11] Indeed, the FCC did not base its decision on any instance of harmful interference documented in the record.

[12] Motorola also believes that the table contains a transcription error from the EIA/TIA bulletin. For 25 kHz equipment, one standard is provided for base and portable units and another is provided for mobile radios. Apparently, the two standards are needed to address different requirements for radios operating in the 500-512 MHz band. However, review of the EIA/TIA standard shows there to be no difference. Therefore the tables currently applicable to base stations and portable radios should be recaptioned as applicable to all 25 kHz equipment. The second table currently applicable to 25 kHz mobile radios should be deleted. Furthermore, Motorola recommends that the three frequency columns (150 to 174 MHz, 450 to 500 MHz and 500 to 512 MHz) be replaced by two columns (150 to 174 MHz and 421 to 512 MHz. There is no need to distinguish between radios operating at 470-500 MHz and 500-512 MHz as the Commission's adopted rules provide.

indicated." This language will clarify the rule's applicability and grandfather existing radios.[13]

IV. EMISSIONS AND MODULATION REQUIREMENTS

The *Report and Order* modified Section 90.207 in order to clarify in simple terms the various types of emissions and their designators that are authorized under Part 90. Motorola's iDEN technology employs highly spectrum efficient time division multiple access and multiple QAM subcarriers to provide data, voice and facsimile. For operations above 800 MHz, iDEN has been authorized an emission designator of W7W. The revision of Section 90.207 does not include this as a possible designator. Although the designator remains valid under Section 2.201 of the Commission's Rules, it is recommended that Part 90 be modified to recognize a valid designator for TDM emissions.

Further, Section 90.211 has been substantially revised to provide ultimate flexibility to licensees in the choice of modulation and technology. Paragraph (a) as revised states that "Transmitters utilizing **analog emissions** that are equipped with an audio low-pass filter must meet the emission limitations specified in Section 90.210 under all possible conditions of operation." In the equipment authorization context, the phrase "under all possible conditions of operation" places a nearly impossible measurement on both manufacturers and on the Commission. Section 2.989 and 2.991 provide the precise mode of operation that the equipment is tested under to determine compliance with FCC rules. It is therefore requested that Section 90.211(a) be revised to delete the phrase "under all possible conditions of operation." Of course, the Commission could also refer to the type acceptance rules of Part 2 for further clarity.

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[13] Motorola notes that there is no evidence that this phenomena is actually causing significant interference. Therefore, grandfathering existing equipment will not have any negative impact.

V. MISCELLANEOUS ISSUES

In Section 90.75 of the new rules, the frequencies 467.850 MHz, 467.8875 MHz, and 467.9125 MHz are associated with footnote number 50 which limits their availability to existing stations licensed prior to August 15, 1995. Supposedly, the frequencies were reassigned to another radio service through the application of the Commission's channel assignment criteria articulated in paragraph 60 of the *Report and Order*. These three frequencies, however, had been available on an exclusive basis to the Business Radio Service under former rule section 90.267. Moreover, they are interstitial to regularly assignable 25 kHz channels available on an exclusive basis to the Business Radio Service. Therefore, relying upon the Commission's articulated reassignment policies, these frequencies should remain available to the Business Radio Service. Therefore, these frequencies should be disassociated from footnote number 50 in Section 90.75.[14]

In Section 90.213 of the new rules, frequency stability for base stations operating in the 421-512 MHz band are required to be within 5 parts per million. According to paragraph 93 of the Commission's *Report and Order*, the new requirements are based on the submission by the TIA. The traditional frequency stability for 25 kHz base station transmitters in the UHF band has been 2.5 parts per million. Indeed, the TIA submission requested that the UHF frequency stability for 25 kHz base stations be maintained at 2.5 parts per million. Motorola assumes this to be a typographical error and asks that new section 90.213 be revised to specify a frequency stability of 2.5 parts per million for UHF 25 kHz base station transmitters.

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[14] Motorola further notes that since these frequencies are 12.5 kHz removed from frequencies limited to a maximum output power of 2 watts, it would be appropriate to limit their use to low power, *i.e.*, 2 watt, uses as well.

VI. CONCLUSION

Motorola commends the Commission on a thoughtful resolution to this long and arduous proceeding. The technical standards adopted, with appropriate minor modifications, will serve the private land mobile community well into the next century.

Respectfully Submitted,

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